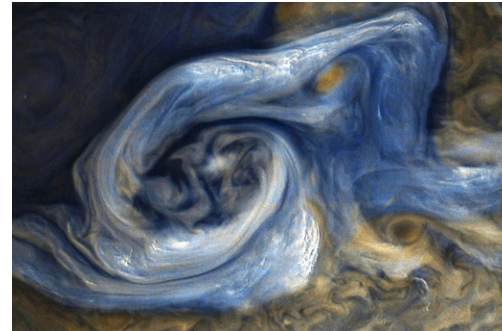
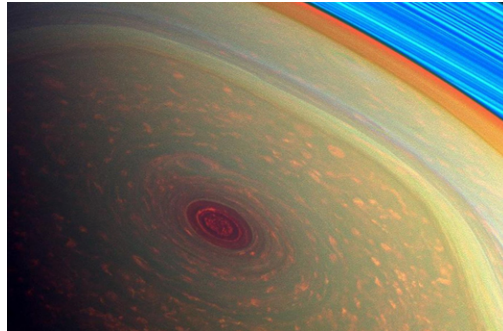
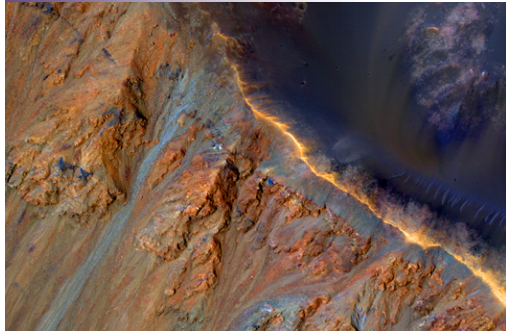


SCIENCE

National Aeronautics and
Space Administration



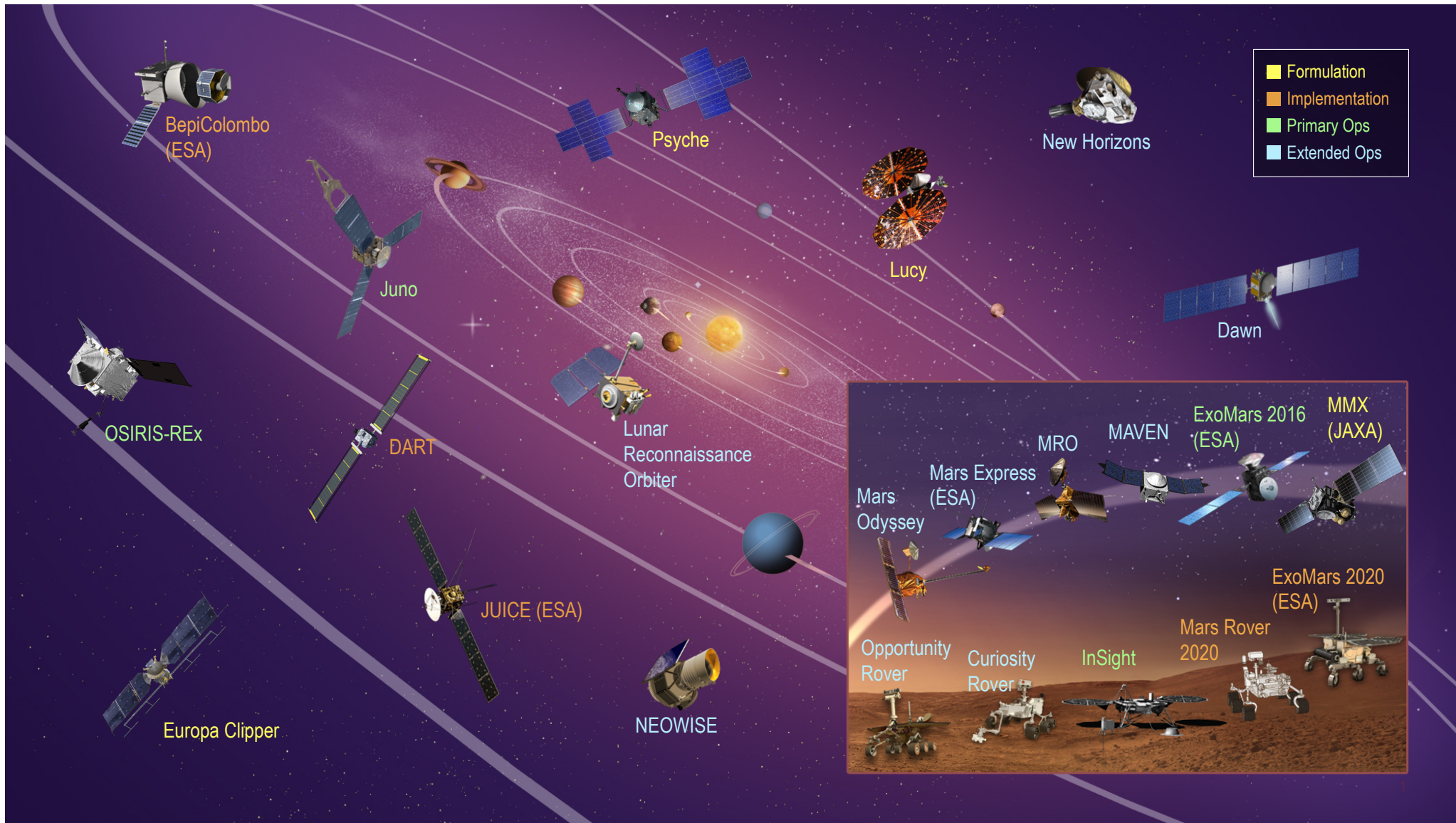
Planetary Science Advisory Committee (PAC)

PLANETARY SCIENCE DIVISION

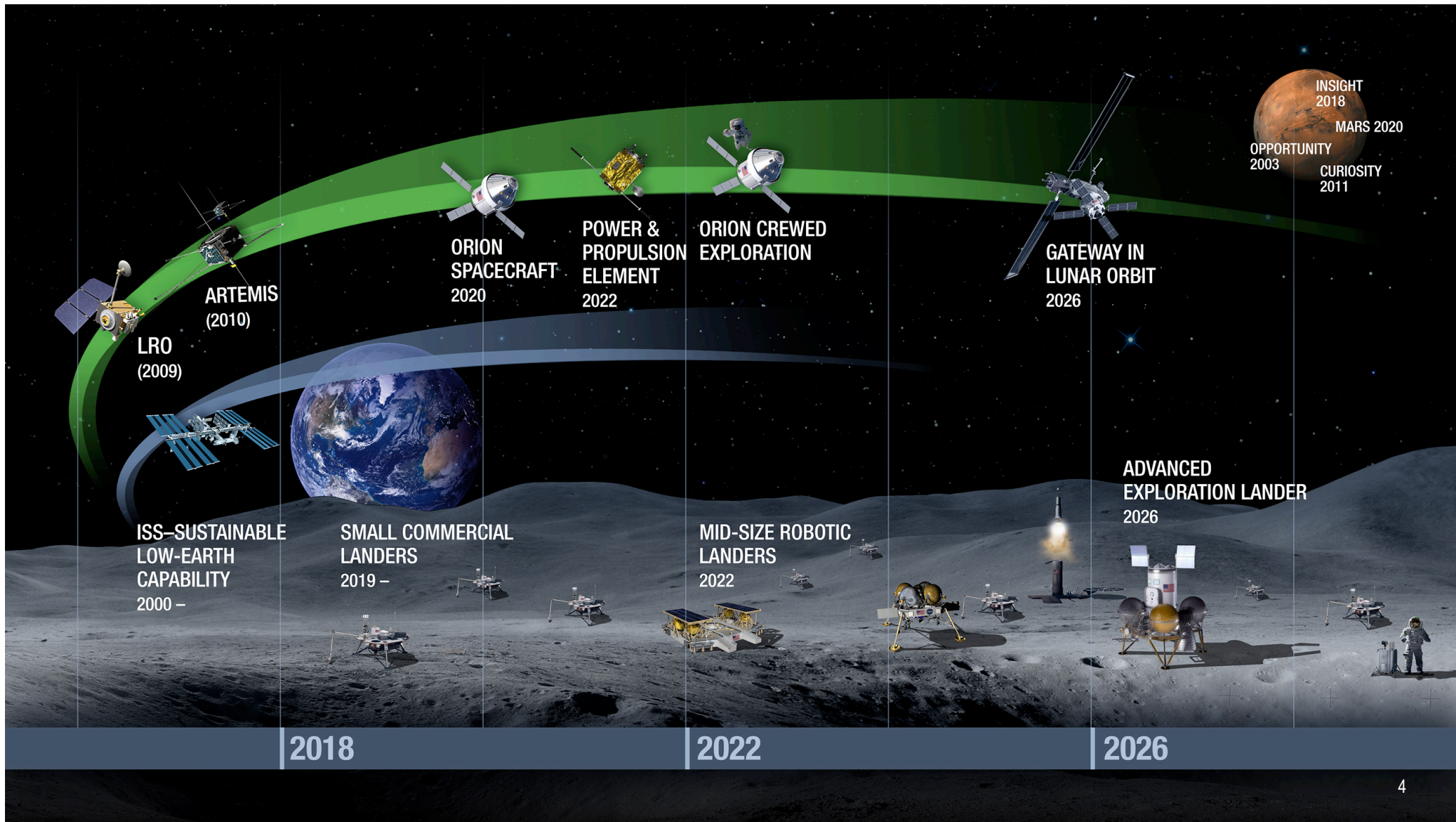
Lori S. Glaze

Planetary Science Division Director (Acting)
Science Mission Directorate, NASA

September 26, 2018



NASA Exploration Campaign



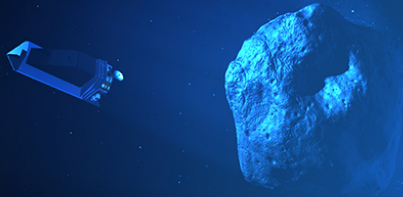


Planetary Defense

Kelly Fast

ASSESS

[CENTER FOR NEAR EARTH
OBJECT STUDIES]



SEARCH, DETECT & TRACK

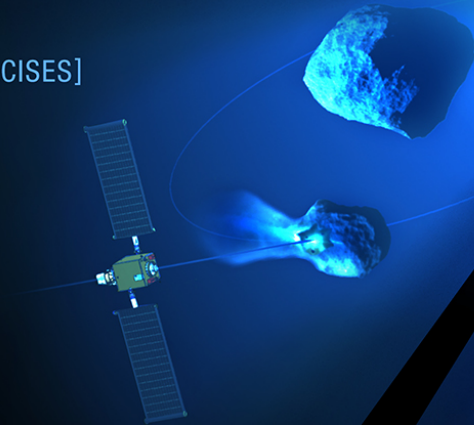
[GROUND-BASED & SPACE-BASED
OBSERVATIONS, IAWN]



PLANETARY DEFENSE

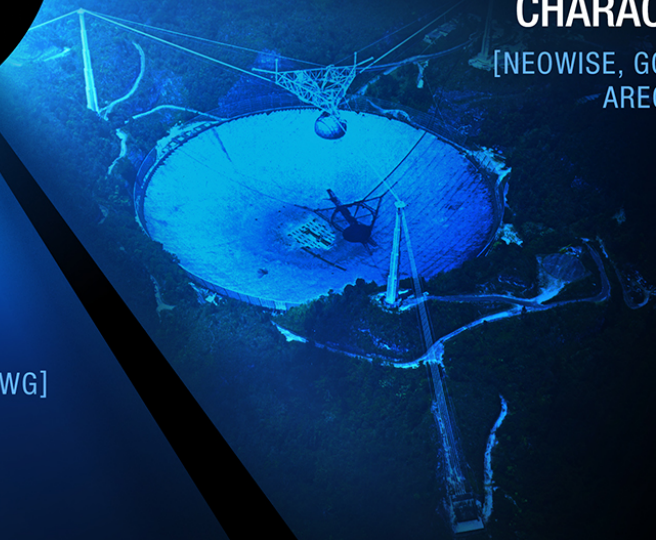
MITIGATE

[DART, FEMA EXERCISES]



CHARACTERIZE

[NEOWISE, GOLDSTONE,
ARECIBO, IRTF]



PLAN & COORDINATE

[SMPAG, PIERWG, DAMIEN IWG]



PSD R&A Update

Jonathan Rall

ROSES 18 Due Dates

Program Name	Step-1 Due Date	Step-2 Due Date
Juno PSP	03/01/2018	04/26/2018
Exobiology (EXOB)	04/16/2018*	05/24/2018
Exoplanets (XRP)	03/29/2018	05/30/2018
Emerging Worlds (EW)	04/12/2018	06/01/2018
Development & Advance of Lunar Instruments (DALI)	04/03/2018	06/05/2018
Solar System Obs. (SSO)	04/05/2018	06/07/2018
MatISSE	04/18/2018	06/20/2018
Laboratory Analysis of Returned Sample (LARS)	04/26/2018	06/28/2018
Planetary Data Archiving, Restoration, Tools (PDART)	05/10/2018	07/12/2018
Cassini Data Analysis (CDAP)	06/01/2018	08/14/2018
New Frontiers Data Analysis Program (NFDAP)	06/12/2018	08/23/2018
Instrument Concepts for Europa Exploration 2	06/22/2018	09/07/2018
Planetary Major Equipment/Facilities (PMEF)	07/17/2018	09/17/2018
Discovery Data Analysis (DDAP)	08/30/2018	11/01/2018
Rosetta Data Analysis Program (RDAP)	08/30/2018	11/01/2018
CDAP Data Release 54	09/18/2018	12/7/2018
PICASSO	09/20/2018	11/20/2018
Habitable Worlds (HW)	11/15/2018	01/17/2019
Solar System Workings (SSW)	11/15/2018*	01/31/2019
Lunar Data Analysis (LDAP)	11/29/2018	02/28/2019



High Risk/High Impact Research at NASA

NAS Recommendation

- “NASA needs to investigate appropriate mechanisms to ensure that high-risk/high-payoff fundamental research and advanced technology-development activities receive appropriate consideration during the review process.” *Review of the Restructured Research and Analysis Programs of NASA’s Planetary Science Division, 2017, p. 31.*
- There is also the wide spread perception that NASA peer review, and possibly all peer review, is hostile to truly innovative, high-risk research and technology development proposals.

Data on High Risk/High Impact Proposals

- For one year, asked our peer reviewers to answer the following questions:
- **IMPACT:** How large an effect on current thinking, methods, or practice would this project have, if successful?
 - Three choices: high (H), medium (M), low (L)
- **RISK:** To what extent would this proposal test novel and significant hypotheses, for which there is scant precedent or preliminary data or which run counter to the existing scientific consensus.
 - Three choices: A great extent (G), to some extent (S), little or none (L)
- Looked at the results for 1,577 proposals submitted to ROSES-2017.

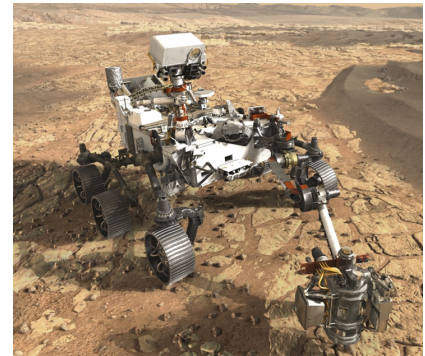
Results

- 10% of proposals in examined set were judged to be high-impact/high-risk
- 24% of all proposals (regardless of risk or impact) were selected for funding
- 35% of high-risk/high-impact proposals were selected for funding
- Merit score driven by perceived impact regardless of perceived risk
- Panel process seems agnostic to risk level for proposals judged to have high-to-moderate impact.

Mars Exploration Program

MEP News & Status

- All Operating Missions are doing well
 - Opportunity status pending outcome after dust storm subsides
 - MRO battery charging issue resolved
 - MAVEN orbit adjustment (in 2019) to facilitate improved communications relay for Mars 2020
 - Apoapsis change from 6200 km to 4000/4500 km
- All Development Missions and systems are doing well
 - Successful Mars 2020 Systems Integration Review (SIR) and Agency KDP-D
 - Excellent technical progress
 - Healthy schedule & budget reserves
 - MOMA instrument delivered for ExoMars Rover integration
- Progressing in our technology maturation program for key technologies that would support a potential future Mars Sample Return (MSR) mission
- Beginning preparations for the next Decadal; considering studies and roadmap activities



Discovery Program

Discovery Long-Range Planning

- Cost Cap ~\$495M Phase A-D (FY19) excluding LV
- May propose the use of radio-isotope power systems (RPS)
- May include radioisotope heater units (RHUs)

+ Release of draft AO October 2018 (target)

Release of final AO February 2019 (target)

Pre-proposal conference ~3 weeks after final AO release

Proposals due 90 days after AO release

Selection for competitive Phase A studies December 2019 (target)

Concept study reports due November 2020 (target)

Down-selection June 2021 (target)

Launch readiness date Latter half of 2020's

New Frontiers Program

New Frontiers 4 AO

Investigations (listed without priority)

- Comet Surface Sample Return
- Lunar South Pole-Aitken Basin Sample Return
- Ocean Worlds (Titan, Enceladus)
- Saturn Probe
- Trojan Tour and Rendezvous
- Venus In Situ Explorer

12 Proposals received on April 28, 2017

Step-1 Selections Announced December 2017

Phase A Concept Study Reports due..... December 2018

Down selection for Flight (target)..... July 2019

Launch Readiness Date..... NLT December 31, 2025

Oceans Worlds

Europa Clipper

- Preliminary Design Review conducted August 20 – 24
- The Standing Review Board Highlighted:
 - The Europa Clipper Team is exceptional
 - The payload complement is very robust with margin against the Level 1 requirements
 - The system approach and design is sound
 - Most areas met requirements for a PDR, with the exception of the Solar Array design which has not yet passed it's PDR, and the associated accommodation of radar on the solar array
 - This mission is as complex as it is exciting
- Programmatic analysis continues with multiple independent cost and schedule estimates in development
- At this time we expect the Mission to come forward for a Confirmation Review in spring, 2019.



NASA Astrobiology Institute

Building a Research Collaboration Network

NASA SMD is committed to interdisciplinary and interdivisional research:

- There are numerous ways to stimulate and support this type of research
- NAI is one, another is NExSS which is based on a Research Collaboration Network (RCN) model

NAI cutting-edge nature and the collaborations it fostered play a critical role in:

- Growing the astrobiology discipline and community
- Leading the international astrobiology community for much of its 20 years of existence

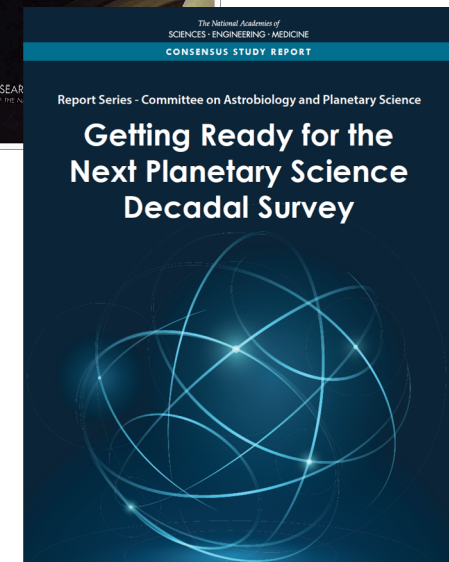
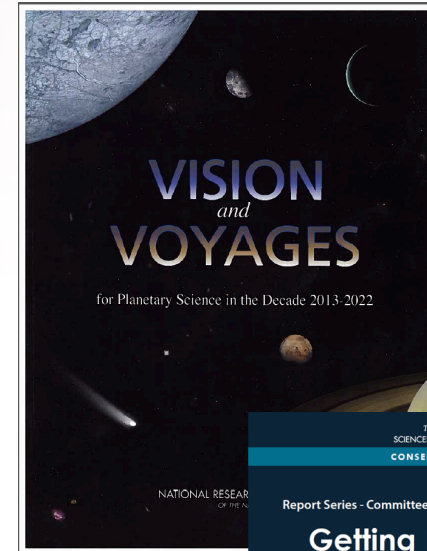
NExSS experiment has proven itself and a key reason is that it is run by the community itself



NASA Planetary Science Studies

Timeline of Studies

- 1st Planetary decadal: 2002-2012
- 2nd Planetary decadal: 2013-2022
- CubeSat Review: Completed June 2016
- Extended Missions Review: Completed Sept 2016
- R&A Restructuring Review: Completed June 2017
- Searching For Life : Completed Sept 2017
- Large Strategic Science Missions: Completed Aug 2017
- Midterm evaluation:
 - Tasked August 26, 2016
 - Above NAS studies will be input
 - Report to NASA released in August 2018
- Sample Analysis Investment Strategy
 - Started November 2017
- 3rd Planetary Decadal: 2023-2032
 - To be tasked *before* October 2019
 - Expect report to NASA due 1st quarter 2022
- CAPS reviewed completed studies and recommended several more to be completed





Plan for Conducting Pre-Decadal Mission Concept Studies

- Ceres study has been initiated at JPL
 - SDT members are being vetted per FACA requirements
- Mars Sample Return architecture studies are underway
- Propose to conduct remaining studies through a competed ROSES opportunity for science teams
 - Approximately 1 year duration studies, staggered over ~2 years
 - Support for 2 – 3 face-to-face meetings and ~2 Team runs
 - Requirement for community updates at Analysis Group meetings and/or town halls as well as at a final Findings Workshop
 - Final reports, including advocacy cost estimates, to be provided to the Decadal Survey as input

PAC Recommendations from July 2, 2018

1. FINDINGS CONCERNING THE UPCOMING PLANETARY DECADAL SURVEY: MISSION STUDIES

➤ PAC is concerned that a rigid interpretation of the Federal Advisory Committee Act (FACA) rules is impeding the progress in getting mission studies completed for the upcoming Planetary Decadal Survey. Requiring all Science Definition Team (SDT) members for each mission study to be Special Government Employees (SGEs) significantly prolongs the formation of each SDT that will conduct these studies. We are on the eve of the charge for the next Decadal and the SDTs for these mission studies need to be formed soon. The SDTs do not provide advice to NASA in the same way that the PAC and other Advisory Committees do; therefore, the PAC encourages NASA to conduct mission studies in ways that do not require appointing numerous SGEs, possibly through the Assessment or Analysis Groups.

✓ Missions studies will now be a ROSES call instead of FACA committees.

2. FINDINGS CONCERNING THE UPCOMING PLANETARY DECADAL SURVEY: OPEN NEW FRONTIERS

- For the upcoming Planetary Decadal Survey, PAC encourages NASA to include in its charge to the National Academies that the New Frontiers mission class be open to all targets and destinations, as the Discovery mission class is, rather than limited to a fixed set of targets provided by the Decadal Survey. An open New Frontiers competition would enable proposing teams to be creative in their mission objectives and designs and to be fully responsive to new discoveries, enabling NASA to obtain the highest science return on its investments.
- ✓ PSD is identifying allowable terms in the decadal survey statement of work, without unduly influencing the process.

3. FINDING ON NASA'S INTERNAL SCIENTIST FUNDING MODEL (ISFM):

- PAC appreciates NASA's efforts to increase efficiency in the use of science dollars; however, the implementation of the ISFMs at NASA centers must be done in a transparent manner so the Planetary Community is fully aware of this funding model. Key to the transparency of this funding model will be the performance metrics by which it is evaluated, to be made available to those both inside and outside of NASA centers.
- ✓ *We are just completing the first year of ISFM.*
- ✓ *We plan to have first year metrics at the next PAC meeting.*
- ✓ *Planned metrics include:*
 - ✓ *Number of submitted ROSES proposals (early evidence from Emerging Worlds indicates a drop)*
 - ✓ *Number of ISFM-supported panel reviewers and other types of community service*
 - ✓ *Productivity reports and publications statistics*
 - ✓ *Number of Early Careers supported*

4. FINDING ON THE PLANETARY DEFENSE COORDINATION OFFICE (PDCO):

- Given the importance of planetary defense to NASA and the public, PAC recommended at its previous meeting in February, 2018 that NASA's Planetary Defense Coordination Office (PDCO) make regular reports to the PAC on the progress and plans being made in regards to meeting the George E. Brown survey objective of detecting and tracking >90% of Near Earth Objects (NEOs) larger than 140m, and smaller NEOs. Now that the Administration has requested a significant increase in FY19 funding for PDCO, PAC would like to see the PDCO program objectives, summary program plan to meet these objectives, and roadmap with dates of key milestones included in the complete PDCO report at the next PAC meeting.

✓ *Agreed → Kelly Fast presenting today*

5. FINDING ON NASA FLIGHT MISSIONS GOING INTO SENIOR REVIEW:

- PAC is concerned that many NASA flight missions are not getting sufficient budget guidance in time to write competitive proposals for the Senior Review.
- + PAC recommends that missions be provided budget projections as early as possible to inform their extended mission proposals.
- ✓ *PAC will be evaluating terms of reference during the meeting which will kick off the Senior Review process.*
- ✓ *PSD Recognizes importance of budget guidance and is looking to send information to teams soon.*
- ✓ *Bill Knopf presentation will provide more details on schedule and process.*

6. FINDING ON THE FORMATION OF A MERCURY ANALYSIS GROUP

- PAC is delighted to hear that NASA will soon be forming a Mercury Analysis Group. PAC would like to see a Mercury mission on the list of mission studies to be done for the next Planetary Decadal Survey.
- ✓ *PSD is working on identifying Mercury Analysis Group POC*
- ✓ *PSD is considering adding Mercury mission study*

7. FINDING ON PLANETARY INPUT INTO THE ASTROPHYSICS DECADAL SURVEY

- PAC is concerned that the Astrophysics Decadal Survey is proceeding without input from the Planetary Science Community. PAC recommends that there be representation from the Planetary community on the Committees assessing priorities for space and ground-based astronomy in the coming decade.
- ✓ *Propose a presentation from the Astrophysics Assets for Planetary Science and continue from there....*
- ✓ *PSD is looking for additional feedback from NAC Science Committee (Anne Verbiscer)*

We Are All Responsible For Addressing Harassment In The Workplace.

- Anti-harassment message from NASA Associate Administrator for the Science Mission Directorate *Thomas H. Zurbuchen*
- Thank you to PEN, LPI, and DPS for helping to disseminated to the Planetary Community
- Already received positive feedback form Community.

“.... relentlessly passionate about: building effective and innovative teams that achieve amazing results for NASA Science.

.... To achieve excellence, we need focus and commitment from the best and brightest of all backgrounds.

.... This goes hand-in-hand with my strong belief in the value and imperative of diversity and inclusion....”

QUESTIONS ?

